

Computer in Health/Medical Education

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Outlines

Reality of Healthcare

Healthcare Education

Theories of Learning

Mode of Computer-based learning



Reality of Healthcare

- **Multidisciplinary team**
- **Constant learning**
- **Information Rich Environment**
- **Provide high quality care**



Healthcare Education

1. Problem-based learning , Case-based learning

2. Content

- **Physiological processes**
- **Procedures, Effects of Intervention**
- **Soft skills (interpersonal skills, leadership ethics)**
- **Information & Communication Technology(ICT) skills (basic Office, library database, smart phone Apps)**



Healthcare Education

3. Teaching Strategies

- **One-way lecture based**
- **Two-way interactive (Computer-based, e-learning)**
- **Online**

4. Assessment Methods

- **Multiple choice Questions (Midterm, Final)**
- **Short answers**
- **Assignment**
- **Project**
- **Presentation**



Theories of Learning

Behaviorism

- How one learn by looking at the observable behaviour
- Based on stimuli and responses
- Not all process of learning can be measured (such as understanding, reasoning)

Cognitive Science

- the process of learning is based on thinking
- Mind is information processing system
- Learning is permanent change in cognition
- brain is no longer black box, it is a dynamic system



Theories of Learning

Constructivism

- learning process through interaction
- problem-based learning (PBL)
- arriving to solution given the knowledge available



Mode of Computer-based learning

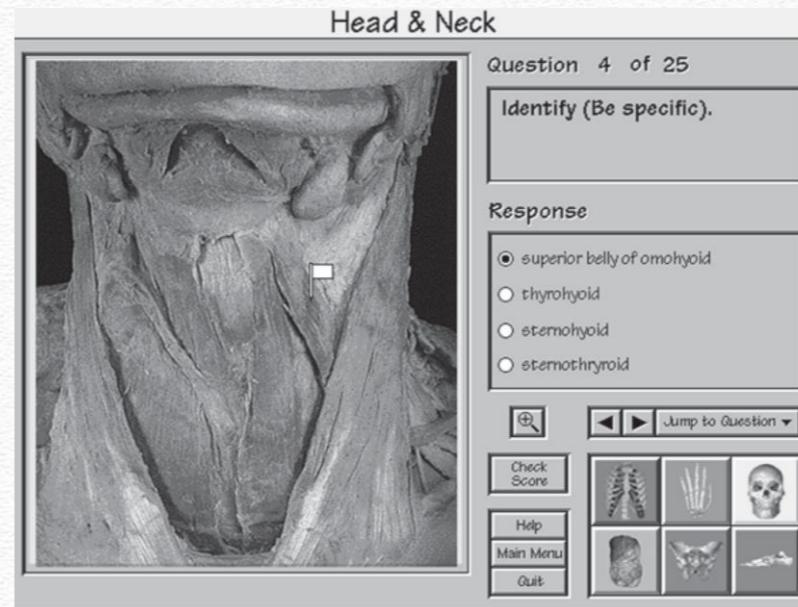
- **Student needs references to facts and knowledge**
- **Must know how to apply to form diagnostic hypothesis & plan therapies**
- **Computer is used for a wide range of learning methods- from drilling students to allowing student to explore a body of material**



Mode of Computer-based learning

Drill and Practice

- Present material to students
- Answer MCQ
- Repeat till mastery
- Move to the next material



Advantages: Student can learn factual material

Allow everyone to learn on their own pace without needing one to one guidance



Mode of Computer-based learning

Digital Lecture

- Recorded and broadcast to students
- Podcast, Webinars
- Other media: Youtube, Slideshare
- Open Courseware by MIT (2001) can be shared across partner universities

http://scpd.stanford.edu/scpd/students/Video/embed.asp?Stream=http://proedvid.stanford.edu/medi - Micr

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**Virtual Colonoscopy:
Technique**

- 3D volumetric data is acquired by spiral CT
- Virtual camera is automatically "piloted" through the colon
- Volume rendered virtual endoscopic images are interpreted

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Mode of Computer-based learning

- **Exploration: students have the freedom to explore without guidance and interruptions**

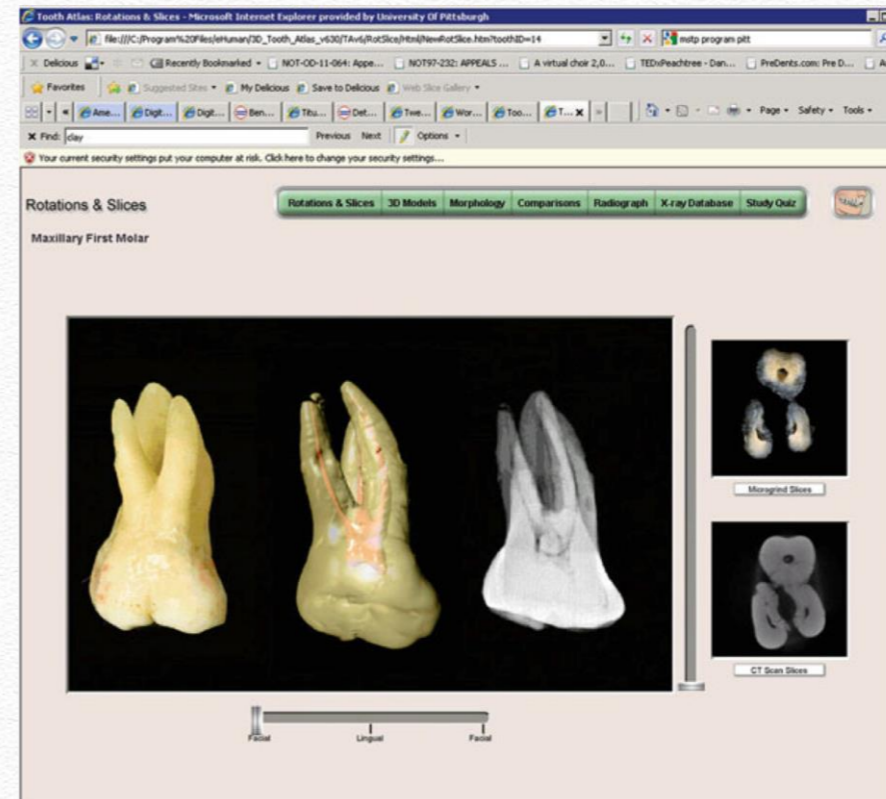
Brain structure- explore the images, observing the location, size of structure change

- **Advantage: Encouraged self-discovery and experimentation**
- **Disadvantage- Without guidance, students may be lost (do not meet learning objectives) and wasting time**



Mode of Computer-based learning

- **Exploration**



- **Tooth Atlas**
- **Exploring dental anatomy**
- **3D model and radiographs**



Mode of Computer-based learning

problem- based learning

- Process of arriving at a solution through accessing and using a body of knowledge.
- The computer presents the learner with a story that includes a problem.
- The learner may be required to investigate the situation.



Mode of Computer-based learning

Simulation



Surgical
Simulation
CAE Healthcare
revolutionizing
medical education



Mode of Computer-based learning

- **Simulation**
 - Engage and actively involved in decision making
 - **Interaction between a student and a simulated patient**
 - Approximate the real-world experience of patient care
 - Put attention to subject being presented
 - Simulation can be static vs dynamic
 - **Static-** predefined problems and clinical outcomes
 - **Dynamic-** simulate changes as students are interacting; make students understand their actions and clinical outcomes
 - Effective learning using constructive approach to learning



Mode of Computer-based learning

- **Simulation**
 - **Immersive simulated environments**



Reference

Shortliffe, E. H., & Cimino, J. J. (2014). Biomedical Informatics: Computer applications in health care and biomedicine, Springer

